UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/021,111 | 12/11/2001 | James J. Carrig | 080398.P497 | 8950 |

8791 7590 05/16/2005

BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CA 90025-1030

| EXAMINER | |
|---|---|
| PERUNGAVOOR, SATHYANARAYA V | |
| **ART UNIT** | **PAPER NUMBER** |
| 2625 | |

DATE MAILED: 05/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/021,111 | CARRIG, JAMES J. | |
| | Examiner | Art Unit | |
| | Sath V. Perungavoor | 2625 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *14 March 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-3,5-16,18-33 and 35-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-16,18-33 and 35-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Amendment*

**[1]** The response filed on 14 March 2005 has been entered and made of record.

### *Response to Arguments/Amendments*

**[2]** Applicant's arguments filed on 14 March 2005 have been fully considered, but are moot in view of the new ground(s) of rejection.

**Drawings Objections**

*Summary of Arguments:*

Applicant has placed the "Prior Art" legend on Figure 7; hence the objection should be withdrawn.

*Examiner's Response:*

Agreed. Examiner thanks the applicant for resolving this issue and withdraws the objection.

**Claim Objections**

*Summary of Arguments:*

Applicant has amended claims to overcome the objection; hence the objection should be withdrawn.

*Examiner's Response:*

Agreed. Examiner thanks the applicant for resolving this issue and withdraws the objection.

***Claim Rejections - 35 USC § 103***

**[3]** The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-9 and 11-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bender et al. (U.S. Patent Number 5,657,402) in view of Crinon et al. (U.S. Patent Number 6,285,804).

Regarding claim 1, Bender et al. disclose a method for image enhancement comprising (Col. 3, Lines 2-4): receiving an input image (402 in Fig. 12; The figure shows the receiving of the input image for processing and enhancement.); matching regions of the input image to other available data (Fig. 5, Col. 9, Lines 13-17; The image regions are matched with other higher resolution data and this process is shown in fig. 5, where 201 is matched with data 300.); forming a combined image containing some pixels spaced more closely than the input image (Fig. 5, Col. 17, Lines 30-34; Fig. 5 shows clearly that certain regions like 300 have pixels closely spaced than the input image 201.), and generating an output image based on the combined image, wherein the output image resolution is finer than the input image resolution (Col. 3, Lines 2-9; The cited reference's invention involves image resolution enhancement and this involves generating an output image at a resolution finer than the input image resolution.).

Bender et al. do not explicitly disclose snapping pixels in the input image and pixels associated with the matching regions to a grid corresponding to a resolution for the combined image.

Crinon et al. explicitly disclose snapping pixels in the input image and pixels associated with the matching regions to a grid corresponding to a resolution for the combined image (Fig. 2, Column 1 Line 40 - Column 2 Line 21: 19 represents the combined resolution grid, 17 represents the input image and 'x' represents matching region samples.).

It would have been obvious to one of ordinary skill in the art to form a combined image by snapping pixels of the input image and matching regions to a grid. One would be motivated to perform the snapping into a grid to increase the resolution of the reference image beyond its current resolution level in order to generate an enhanced image (Crinon et al.: Column 2 Lines 1-5).

Regarding claim 2, Bender et al. discloses the method according to claim 1, wherein the output image resolution is less than or equal to the resolution of the combined image (Col. 3, Lines 2-9; Col. 9, Lines 27-35: Equal to is disclosed.).

Regarding claim 3, Bender et al. discloses the method of claim 1 wherein generating an output image at a resolution finer than the input image resolution further comprises applying a least squares filter to generate each output pixel (Col. 10, Lines 48-49).

Regarding claim 5, Bender et al. discloses the method according to claim 1, wherein generating further comprises applying a filter to generate each output pixel (Col. 12, Lines 4-7).

Regarding claim 6, Bender et al. discloses the method according to claim 5, wherein the filter comprises an optimal least squares filter for each output pixel (Col. 10, Lines 48-51).

Regarding claim 7, Bender et al. discloses the method of claim 6 wherein the optimal least squares filter for each output pixel is based on an irregular sample grid (Col. 10, Lines 48-49; Col. 9, Lines 28-35: Gaps disclosed are a result of the irregular pixel placement from the input image and other available data.).

Regarding claim 8, Bender et al. discloses the method of claim 1 wherein other available data changes over time (Col. 5, Lines 60-66).

Regarding claim 9, Bender et al. discloses the method of claim 1 wherein the image and other available data are video images in a home networking database (Col. 5, Lines 54-60).

Regarding claim 11, Bender et al. discloses a processing system comprising an electronic data processor, which when executing a set of instructions performs the method of claim 1 (Col. 6, Lines 3-10).

Regarding claim 12, Bender et al. discloses a machine-readable medium having stored thereon instructions, which, when executed, performs the method of claim 1 (Col. 6, Lines 3-10).

Regarding claim 13, Bender et al. discloses the machine-readable medium of claim 12 wherein the input image is retrieved from and the output image is stored to a home networked database (Col. 5, Lines 54-60).

Regarding claim 14, Bender et al. discloses an apparatus for image enhancement comprising (Col. 3, Lines 2-4): means for receiving an input image (402 in Fig. 12; The figure shows the receiving of the input image for processing and enhancement.), means for matching regions of the input image to other available data (Fig. 5, Col. 9, Lines 13-17; The image regions are matched with other higher resolution data and this process is shown in fig. 5, where 201 is matched with data 300.); means for forming a combined image containing some pixels spaced more closely than the input image, and (Fig. 5, Col. 17, Lines 30-34; Fig. 5 shows clearly that certain regions like 300 have pixels closely spaced than the input image 201.) means for generating an output image based on the combined image, wherein the output image resolution is finer than the input image resolution (Col. 3, Lines 2-9; The cited reference's invention involves image resolution enhancement and this involves generating an output image at a resolution finer than the input image resolution.).

Bender et al. do not explicitly disclose snapping pixels in the input image and pixels associated with the matching regions to a grid corresponding to a resolution for the combined image.

Crinon et al. explicitly disclose snapping pixels in the input image and pixels associated with the matching regions to a grid corresponding to a resolution for the combined image (Fig. 2, Column 1 Line 40 - Column 2 Line 21: 19 represents the combined resolution grid, 17 represents the input image and 'x' represents matching region samples.).

It would have been obvious to one of ordinary skill in the art to form a combined image by snapping pixels of the input image and matching regions to a grid. One would be motivated to perform the snapping into a grid to increase the resolution of the reference image beyond its current resolution level in order to generate an enhanced image (Crinon et al.: Column 2 Lines 1-5).

Regarding claim 15, Bender et al. discloses the apparatus according to claim 14, wherein the output image resolution is less than or equal to the resolution of the combined image (Col. 3, Lines 2-9; Col. 9, Lines 27-35: Equal to is disclosed.).

Regarding claim 16, Bender et al. discloses the apparatus of claim 14 wherein means for generating an output image at a resolution finer than the input image resolution further comprises applying a filter to generate each output pixel (Col. 12, Lines 4-7).

Regarding claim 18, Bender et al. discloses the apparatus according to claim 14, wherein means for generating further comprises solving a least squares problem to generate each output pixel (Col. 10, Lines 48-49).

Regarding claim 19, Bender et al. discloses the apparatus according to claim 18, wherein a solution to the least squares problem comprises an optimal least squares filter for each output pixel (Col. 10, Lines 48-51).

Regarding claim 20, Bender et al. discloses the apparatus of claim 19 wherein the optimal least squares filter for each output pixel is based on an irregular sample grid (Col. 10, Lines 48-51; Col. 9, Lines 28-35).

Regarding claim 21, Bender et al. discloses the apparatus of claim 14 wherein other available data changes over time (Col. 5, Lines 60-66).

Regarding claim 22, Bender et al. discloses the apparatus of claim 14 wherein the image and other available data are video images in a home networking database (Col. 5, Lines 54-60).

Regarding claim 23, Bender et al. discloses a system comprising an electronic data processor, which when executing a set of instructions, performs the following (Col. 6, Lines 3-10): retrieves a first video image at a first resolution (402 in Fig. 12; The figure shows the receiving of the first image at a first resolution for processing and enhancement.); forms a second video image at a second resolution and (201 at Fig. 5; Col. 5, Lines 58-60; Col. 17, Lines 30-34; The image regions are matched with other higher resolution data and a second image is created at a second resolution.); generates a third video image based on the second video image, wherein the third video image is at a third resolution that is finer that the first resolution (201 at Fig. 4,

Col. 5, Lines 58-60; Col. 9, Lines 27-35; Col. 3, Lines 2-9; The second image data is interpolated to create a third image at a third resolution.).

Bender et al. do not explicitly disclose snapping pixels in the first video image and sample pixels from an associated video image to a grid corresponding to a resolution for the second video image.

Crinon et al. explicitly disclose snapping pixels in the first video image and sample pixels from an associated video image to a grid corresponding to a resolution for the second video image. (Fig. 2, Column 1 Line 40 - Column 2 Line 21: 19 represents the combined resolution grid, 17 represent the first video image and 'x' represents associated video image.).

It would have been obvious to one of ordinary skill in the art to form a second video image by snapping pixels of the first video image and associated video image to a grid. One would be motivated to perform the snapping into a grid to increase the resolution of the reference image beyond its current resolution level in order to generate an enhanced image (Crinon et al.: Column 2 Lines 1-5).

Regarding claim 24, Bender et al. discloses the system of claim 23 wherein the third resolution is less than or equal to the second resolution (Col. 3, Lines 2-9; Col. 9, Lines 27-35: Equal to is disclosed.).

Regarding claim 25, Bender et al. discloses the system of claim 23 wherein the images may have missing pixels (Col. 9, Lines 27-35).

Regarding claim 26, Bender et al. discloses the system of claim 23 wherein the second and third video image change over time (Col. 5, Lines 60-66).

Regarding claim 27, Bender et al. discloses the system of claim 23 wherein generating a third video image at a third resolution further comprises applying an optimal least squares filter for each output pixel (Col. 10, Lines 48-51).

Regarding claim 28, Bender et al. discloses the system of claim 23 wherein the video images are located on a home networking database (Col. 5, Lines 54-60).

Regarding claim 29, Bender et al. discloses an apparatus comprising (Fig. 12): means for receiving an input image having pixels at a first resolution (402 in Fig. 12; The figure shows the receiving of the first image at a first resolution for processing and enhancement.); means for receiving other available data having pixels at a second resolution (300 at Fig. 3; Col. 7 Lines 20-26; The image regions with second resolution data are gathered as shown in 300.); means for forming a combined image containing some pixels spaced more closely than the input image, and (Fig. 5, Col. 17, Lines 30-34; Fig. 5 shows clearly that certain regions like 300 have pixels closely spaced than the input image 201.); means for generating an output image at a resolution finer than the input image resolution by applying a filter to the combined image pixels (Col. 3, Lines 2-9; Col. 12, Lines 4-7; The cited reference's invention involves image resolution enhancement and this involves generating a filtered output image at a resolution finer than the input image resolution.).

Bender et al. do not explicitly disclose snapping pixels at the first resolution and pixels at the second resolution to a grid corresponding to a resolution for the combined image.

Crinon et al. explicitly state disclose snapping pixels at the first resolution and pixels at the second resolution to a grid corresponding to a resolution for the combined image (Fig. 2, Column 1 Line 40 - Column 2 Line 21: 19 represents the grid, 17 represents the pixels at the first resolution and 'x' represents pixels at the second resolution.).

It would have been obvious to one of ordinary skill in the art to form a combined image by snapping pixels at the first resolution and pixels at the second resolution to a grid. One would be motivated to perform the snapping into a grid to increase the resolution of the reference image beyond its current resolution level in order to generate an enhanced image (Crinon et al.: Column 2 Lines 1-5).

Regarding claim 30, Bender et al. discloses the apparatus of claim 29 wherein the filter comprises a least squares filter (Col. 10, Lines 48-49).

Regarding claim 31, Bender et al. discloses the apparatus of claim 30 wherein the least squares filter is optimal for each output image pixel (Col. 10, Lines 48-51).

Regarding claim 32, Bender et al. discloses the apparatus of claim 29 wherein applying a filter to the combined image pixels comprises applying the filter by a numerical tap method (Equation 10).

Regarding claim 33, Bender et al. discloses the apparatus of claim 29 where the means for forming a combined image comprises means for motion compensation (Col. 20, Lines 51-54).

Regarding claim 35, Bender et al. discloses an apparatus for image enhancement comprising: a first device having an input and an output, the input coupled to receive a first image to be enhanced (406 and 410 in Fig. 12); a second device having an input and output, the input coupled to receive a second image (408 in Fig. 12); a third device having a first input, a second input, and an output, the first input coupled to receive the first device output, and the second input coupled to receive the second device output and (412 in Fig. 12); a fourth device having an input and an output, the input coupled to receive the third device output and the fourth device output coupled to send a third enhanced image, wherein the third enhanced image has a resolution that is less than or equal to the resolution of the grid (414 in Fig. 12; Col. 3, Lines 2-9; Col. 9, Lines 27-35: Equal to is disclosed.).

Bender et al. do not explicitly disclose the snapping the pixels of the first and second images to a grid having a resolution that is finer than that of the first image.

Crinon et al. explicitly disclose snapping the pixels of the first and second images to a grid having a resolution that is finer than that of the first image. (Fig. 2, Column 1 Line 40 - Column 2 Line 21: 19 represents the grid, 17 represents the first image and 'x' represents second image. Grid resolution is finer then first image resolution of 17.).

It would have been obvious to one of ordinary skill in the art to perform snapping the pixels of the first and second images to a grid having a resolution that is finer than that of the

first image. One would be motivated to perform the snapping into a grid to increase the resolution of the reference image beyond its current resolution level in order to generate an enhanced image (Crinon et al.: Column 2 Lines 1-5).

Regarding claim 36, Bender et al. discloses the apparatus of claim 35 wherein the first device input and second device input are coupled to a home network (Col. 5, Lines 54-60).

Regarding claim 37, Bender et al. discloses the apparatus of claim 35 wherein the fourth device output is coupled to a home network (Col. 5, Lines 54-60).

Regarding claim 38, Bender et al. discloses the apparatus of claim 35 wherein the third device further comprises a least squares filtering device having an input and an output, the input coupled to receive an image, the output coupled to send a filtered image (Col. 10, Lines 48-49).

**[4]** Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bender et al. in view of Crinon et al. further in view of Ishikawa et al. (U.S. Patent Number 6,155,726).

Bender et al. meets the restrictions as set forth in the discussion for claim 10. However, Bender et al. does not expressly disclose the transfer of payment for the viewing of the output image.

In the same field of endeavor, Ishikawa et al. discloses the transfer of payment for the output image (Col. 5, Lines 65-67).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bender et al. and develop a method for transfer of payment for viewing of the output image. Since, one would not commonly expect the image enhancement services to be performed at no cost to the user.

*Conclusion*

**[5] THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

*Contact Information*

**[6]** Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mr. Sath V. Perungavoor whose telephone number is (571) 272-7455. The examiner can normally be reached on Monday to Friday from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Bhavesh Mehta whose telephone number is (571) 272-7453, can be reached on Monday to Friday from 9:00am to 5:00pm. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sath V. Perungavoor
Art Unit 2625
May 11, 2005

MEHRDAD DASTOURI
PRIMARY EXAMINER